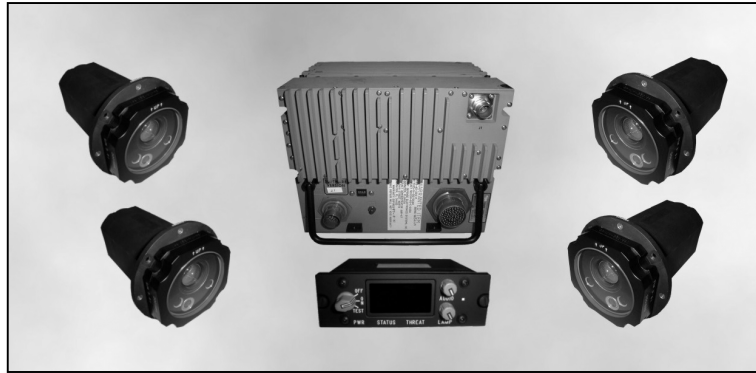# MISSILE AND LASER WARNING SYSTEM, AN/AAR-47(V)2

The AN/AAR-47, originally fielded in the late 1980s, provides passive warning against infrared and laser guided missiles fired at its host platform. In addition to providing warning to the aircrew, it cues an onboard expendables dispenser to eject countermeasures flares to defeat the incoming missile. The system consists of four sensor units oriented about the aircraft to provide 360-degree protection; a processor that analyzes the signals received by the sensors declares an incoming threat, warns the aircrew, and initiates dispensing of flares; and a control/indicator unit provides warning indications to the aircrew and allows control of the system (in some aircraft installations control and indication are integrated into the APR-39 radar warning receiver controls and displays).

The AAR-47(V)2 upgrade provides improved sensors that eliminate sensor blackening, a known failure mode; increases temperature tolerance and provides a more uniform sensitivity; and provides a new filter to improve false alarm control. Additionally, the new sensor has a laser detector that allows the AAR-47(V)2 to provide the functionality of the AVR-2/2A laser warning systems. This added functionality will allow the Navy to retire the AVR2/2A at a considerable cost saving and provide laser warning for aircraft that did not have the AVR2/2A installed. New software, version 22.21, provides increased probability of missile detection and reduced false alarm rate, provides for laser threat correlation and classification, and revises the interface with the APR-39 to provide laser warning information. A new control/indicator that incorporates the laser warning capability is also provided for aircraft without an APR-39.

BACKGROUND INFORMATION

There are roughly 2,500 AAR-47 systems worldwide. Approximately 2,000 belong to DoD; of those, around 1,200 belong to the Navy. The Navy has 254 AVR-2s and 42 AVR-2A systems. Navy aircraft that currently have or are planned to have AAR-47 capability are: H-1 variants, H-3 Type, Model, Series (TMS), CH-46E, H-53 TMS, H-60 TMS, V-22, P-3C, and C-130 TMS. Navy aircraft equipped with AVR-2s are the UH-1N, AH-1W, VH-3, and VH-60. HH-60H aircraft are equipped with the AVR-2A. The Navy's intent is to eventually replace all AAR-47s and AVR-2/2As with the AAR-47(V)2. The Army and Air Force, who have the remainder of the DoD AAR-47s, are not currently planning to upgrade to the AAR-47(V)2.

TEST & EVALUATION ACTIVITY

DT/OT of the missile warning and laser warning capabilities was conducted during FY01. Test events included live missile shots at the Aerial Cable Facility (ACF) at White Sands Missile Range, laser warning flight tests at both White Sands and the Naval Air Warfare Center at Patuxent River, Maryland, and false alarm testing at several locations. The ACF tests used a UH-1 hulk as the test platform and all flight tests were conducted on a UH-1N. The upgraded missile warning functions with software version 22.21 were tested against a baseline system with software version 20.0. The laser warning functions were compared against the performance of the current AVR-2A. The baseline AAR-47 and/or the AVR-2A were installed in the test vehicle, along with the AAR-47(V)2 as appropriate for the test being conducted.

TEST & EVALUATION ASSESSMENT

During DT/OT, the AAR-47(V)2 demonstrated satisfactory performance in all aspects of the missile warning function. Using the version 22.21 software, it detected all 12 missiles of various types fired at it during the live fire tests. The false alarm rate was considerably reduced compared to the version 20.0 baseline software.

The laser warning function performed satisfactorily against one class of threat but unsatisfactorily against another. The unsatisfactory performance was against a threat simulator of questionable validity. A higher fidelity simulator has become available since the completion of the DT/OT. Tests should be conducted against this simulator in later test phases to determine if performance against this class of threat is truly deficient. The laser warning false alarm rate was acceptably low.

Many of the suitability measures of effectiveness await resolution in the remaining dedicated OT phase of testing. The system has demonstrated good reliability to date and only one built-in test false alarm was noted in 81.5 hours of operation.